

MODIS TECHNICAL TEAM MEETING

June 9, 1994

The MODIS Technical Team Meeting was chaired by Vince Salomonson. Present were Steve Ungar, Dick Weber, Wayne Esaias, Dorothy Hall, Bill Barnes, Bruce Guenther, David Herring, Harry Montgomery, Locke Stuart, Jim Smith, Ed Masuoka, John Bauernschub, Al Fleig, and Ken Anderson.

1.0 SCHEDULE OF EVENTS

June 15	533Q Financial Reports due to Teresa Mautino
July 15	Semi-Annual Reports due to Barbara Conboy
Sept. 19-21 (tentative)	SDST Simulation Data Workshop, Flathead Lake, MT
Oct. 18	Calibration Working Group, Greenbelt
Marriott	
Oct. 19 - 21	MODIS Science Team Meeting, Greenbelt Marriott

1.1 Correction to Previous Minutes

Subsequent to this meeting, Steve Ungar pointed out that there was an error in the MODIS Technical Team Minutes from the May 26 meeting. In section 2.3.1 entitled "Schedule Concerns," the second sentence begins "The BOREAS Intensive Field Campaign-3 (IFC-3) and SCAR-C occur within about a month of each other, ...". Please note that this should have read "IFC-2" and that MAS will not fly as part of IFC-3.

2.0 MINUTES OF THE MEETING

2.1 Team Leader Reports

Salomonson recounted a meeting he had with EOS Project personnel to discuss the status of EOS. One topic of discussion centered on the impact to MODIS if X-band direct downlink of data were used instead of using TDRSS. There really is no negative impact apparently if two high latitude ground stations are used (e.g., Fairbanks and Thule). There is an impact if only one ground station were to be available. See Barnes' presentation later in these minutes for details on possible ways of handling TDRSS alternatives.

2.1.1 Direct Broadcast Considerations

Salomonson stated that they also discussed Level 1 requirements that may be impacting the overall system and are cost-drivers. One example is the requirement for direct broadcast of MODIS data (presumably at X-band). Moreover, Salomonson explained that with direct broadcast there apparently may be additional EMI (electromagnetic interference) or undesirable noise that

gets recorded along with the data on the satellite. Others on the Technical Team felt that EMI would not be a problem at X-band. Salomonson asked that Bill Barnes and Dick Weber provide some guidance input on these matters.

2.1.2 Quick Look Data

Also, the need for quick look data was discussed. Originally, one rationale for quick look data included getting an early assessment of the instrument performance. Salomonson said that he had been convinced some time back that spacecraft instrument performance issues did not occur on such a time frame that quick look data are required. Another motivation for providing quick look data was to aid in the planning of field campaigns. In requiring quick look data, however, Salomonson suggested that one has to consider the value-added by the EOS quick-look capability for field campaigns given that AVHRR data can and will be obtainable via HRPT mode. There was a question as to why the European Space Agency and NOAA can routinely process all data in less than three hours, but NASA claims great cost increases to do occasional samples of 5 percent of data in a similar time. No one knew the answer.

Team members are encouraged to comment on these issues noted above and make recommendations via e-mail at their earliest opportunity.

2.1.3 Discussion of the SRCA

Salomonson reported that the EOS AM-1 Executive Council (made up of EOS AM Project Management and Contractor management personnel) had surfaced suggestions that the SRCA performance specifications (Spectroradiometric Calibration Assembly) might better be a goals as opposed to requirements. Weber stated, however, that there it would be inappropriate to change the MODIS contract now. Barnes added that SBRC will test the SRCA once it is built and if it doesn't meet specs, then the Team can decide whether to eliminate or reduce the requirement, or require that it be reworked to meet spec.

2.1.4 "HIRIS" to Launch in 4 Years

Salomonson stated that NASA HQ announced yesterday that TRW intends to launch a HIRIS-type (High-resolution Imaging Spectroradiometer) instrument on a small satellite within the next couple of years. CTA, Inc. will launch in the same time-frame a very high resolution (e.g., 3 meters) instrument. These contracts with NASA were reported on in an article in the June 9 edition of *The Washington Post*.

2.2 MODIS Project Report on Direct Downlink

In response to a request from the PM Flight Project, Barnes presented several approaches to reducing the MODIS rate of data transmission to the ground. One approach is to use on-board lossless data compression technology, which Barnes said could reduce on-board storage requirements and downlink bandpass by 30 percent. In this option, Barnes would like to make the compressor part of the spacecraft system.

Barnes also noted that a reduction in MODIS' swath width would reduce its data output. Another option considered was to send down only one high resolution band over the oceans.

Two high latitude ground stations, or at least one high latitude ground station along with a mid-latitude ground station, would make it such that these issues would go away.

2.3 MODIS Project Reports

Weber reported that the MODIS radiative cooler cold stage is now at 73.4 K. SBRC will now begin adding heat to the focal plane to determine its thermal sensitivity.

Weber announced that the RFP for the EOS PM-1 spacecraft is tentatively scheduled to be released Sept. 1, 1994.

Weber told the Team that a Russian agency visited SBRC and offered to sell them beryllium, which they say they can process better, cheaper, and faster.

2.4 MCST Reports

Guenther reported that Paul Menzel, University of Wisconsin, is hiring an SBRC retiree with experience in IR instrumentation. This person will work with Menzel on IR calibration and will be the interface on IR calibration issues with MCST. Guenther pointed out that this action is in response to criticism that MODIS doesn't have enough expertise in IR issues.

2.5 SDST Reports

Masuoka discussed how EDC (EROS Data Center) produces global 10-day AVHRR composites. They have compared their approach of using control point chips and rasterized Digital Chart of the World (DCW) to their use of a master reference image for navigating the data and the results are similar for both approaches. This led to a discussion of optical navigation as a fall-back option for geolocation. Masuoka explained that the MODIS at-launch method for navigation is to perform dead reckoning with control point chips used to measure errors in navigation. If most of the sources of pointing knowledge errors are static or slowly varying it will be possible to remove them through an analysis of the errors in geolocation and to achieve the 0.1 pixel geolocation accuracy desired by the MODIS Land Group. In the event that the specification for pointing knowledge for the instrument and platform are only just met with all the error being dynamic and short term, then it will not be possible to arrive at the desired 0.1 pixel geolocation accuracy. Optical navigation is being studied as an approach to improve geolocation if it is required in the post-launch time frame. Esaias stated that optical navigation is not an acceptable fallback because it is too costly and processing intensive. Ungar added that optical navigation will not enable registration to within 0.1 pixel.

Salomonson asked for an update on SDST's current thinking on gridding. Masuoka responded that SDST is developing Level 3 tools to send out to the Science Team as part of SDST's ATBD for geolocation, which is due in draft form later this month. Masuoka also stated that he will be sending out a survey to

Team members about gridding and interpolation methods to serve as a point for discussion on the subject. Salomonson asked Masuoka to report on SDST's progress on the gridding survey and Level 3 geolocation tools at each Technical Team meeting.

Ed Chang indicated that SBRC wants to know if MODIS wants more options in the APID field of MODIS packets. Masuoka reported that SDST and MCST agreed upon changing the MODIS APID from a single value that identifies the packet as coming from the MODIS instrument to separate values for each MODIS instrument, i.e. packets from MODIS on AM-1 would have a different APID than PM-1 MODIS packets. The APIDs are used to sort packets in EDOS such that packets with the same APID end up in the same file. Masuoka has transmitted this change to Chang who will relay it back to SBRC.

There was a discussion of only processing on demand. Fleig noted that Level 2 products must be generated so that Level 3 products may be generated. It would be possible, but not necessarily a good idea, to generate the Level 2 products and the dependent Level 3 products and then trash the Level 2 products. Then, if someone later wants Level 2 products again, they could be reprocessed with a newer algorithm. He said that this was essentially a tradeoff of reprocessing time lag and cost versus storage costs. Esaias stated that SeaWiFS considered not saving any Level 2 data, but the SeaWiFS Science Team wanted to save it.

2.6 SSMI-AVHRR Comparison

Hall reported that she is working on an SSMI-AVHRR overlay and will have results in 2 weeks.

2.7 MAS Update

Ungar reported that Yoram Kaufman attended a meeting at NASA Ames to discuss use of the MODIS Airborne Simulator (MAS) on the SCAR-C campaign. MAS will fly on the C130 using the 12-channel mode during BOREAS and on the ER-2, using the new 50-channel mode during SCAR-C.

Ungar stated that BOREAS is going well.

2.8 MAST Reports

Herring announced that the next MODIS Science Team Meeting will be held Oct. 19-21 at the Greenbelt Marriott. There will be a Calibration Working Group meeting on Oct. 18. Herring solicited ideas for possible speakers at the next MODIS Banquet. Anyone with ideas should e-mail him at herring@ltpsun.gsfc.nasa.gov.

Stuart reported that Barbara Conboy, MODIS Communications Manager, is out on sick leave. She is likely to require back surgery and will be out for 4 to 6 weeks. Herring and Janine Harrison will assume Conboy's responsibilities until

she returns. Requests and/or correspondence should be directed to them (herring@ltpsun or harrison@ltpsun).

Stuart announced that SCI funding will be distributed soon. However, SCF money is still tied up in EOS Project.

3.0 ACTION ITEMS

1. *Masuoka*: At Salomonson's request, report on SDST's progress on the gridding algorithm at each Technical Team meeting.

3.1 Action Items Carried Forward

2. *Barker*: Forward information on MODIS' spectral bands to Hugh Kieffer. [In progress. A draft memo has been prepared by MCST and is being reviewed by SBRC. It is expected that the information will be sent to Kieffer by June 24.]

3. *Fleig & Herring*: Review the MODIS brochure and recommend changes/alternatives [Ongoing, will have first draft done by the end of June].

4. *Barnes*: Investigate the procedure for redesignation of channels for night data return (to Kaufman). [Barnes has determined that MODIS channels can be redesignated for night data return; however, this AI is still open.]

5. *Fleig and Ungar*: Interact with the group leaders prior to developing a MODIS data simulation plan for review at the next Science Team Meeting, due July 4.

6. *Masuoka*: Provide Gordon's Water Leaving Radiance software to ESDIS project as a test case for the utility of massively parallel processing after a beta delivery is received from the Oceans Team. [SDST is waiting for delivery of the Ocean Group's beta software.]

3.2 Closed Action Items

1. *Masuoka and Fleig*: Prepare information or provide a tutorial on team member coding standards.

2. *Guenther*: Respond to Slater's letter to Kahle regarding involvement of SWAMP in EOS cross-calibration of algorithms for Level 2 data products. [This Action Item was raised during the ATBD review and will be addressed at the next review.]

3. *Fleig*: Review the impact of using C++ in MODIS algorithm development. [Fleig reported that there is still no standard for using C++. From SDST's perspective, if the MODIS Team wants to use C++ and Project accepts it, then there is no problem. However, it is currently not allowed by EOS Project, although they use it themselves.]

4.0 ATTACHMENTS

NOTE: All attachments referenced below are maintained in MODARCH and are available for distribution upon request. Please contact Barbara Conboy, MODIS Communications Manager, at (301) 286-5411, Code 920,

NASA/Goddard Space Flight Center, Greenbelt, MD 20771 if you desire copies of any attachments.

1. "Elimination of TDRSS from EOS: MODIS Solutions," by Bill Barnes.

5.0 MODIS DOCUMENTS

Note: All recent MODIS documents are maintained in MODARCH. If you would like access to or information about MODARCH, please contact the MODARCH System Administrator, Michael Heney, at (301) 286-4044 or via e-mail at mheney@ltpsun.gsfc.nasa.gov.

1. Geolocation ATBD, by SDST. Due draft to SDST by June 15 with distribution to external reviewers July 15.